

Amendments to the Claims

Please amend claims 1, 6-10, 12-17, 20 and 22-24 and add new claims 26-31 as follows. This listing of the claims will replace all prior versions, and listings, of the claims in this application.

1. (currently amended) A method for determining the movement of particles, ~~particularly impurities~~, in a medium, under the influence of a changing interface between two neighboring phases of the medium, comprising the steps of

(a) Determining the ~~temporal and/or local~~ spatial evolution of said ~~interfae~~ interface over time; and

(b) Determining the movement of said particles in dependence ~~of~~ upon the spatial ~~the~~ temporal and/or local evolution of the phase interface as determined in step (a).

2. (original) A method according to claim 1, comprising the further step of

(c) determining the distribution of the particles at a certain time.

3. (original) A method according to claim 1, comprising the further step of determining the distribution of the particles at a steady state position of the phase interface.

4. (original) A method according to claim 1, wherein the method is performed on the basis of a model defining the medium as having a phase interface described as a smooth transition over a non zero range of the medium.

5. (original) A method according to claim 1, wherein the method is performed on the basis of a model defining the medium as having a phase interface which is described by a discontinuous transition between the two phases.

6. (currently amended) A method according to claim 4, wherein the method is performed on the basis of a model wherein the medium is described by a data field having a first value for the first phase and a second value for the second phase and values in between representing the smooth transition.

7. (currently amended) A method according to claim 6, wherein the spatial evolution of said data field over time is calculated by a differential equation.

8. (currently amended) A method according to claim 6, wherein the method is applied for a medium of a material having at least one crystalline phase and where the data field ~~is describing~~ describes the crystallinity ~~or a related parameter~~ of the medium at a plurality of points in the medium.

9. (currently amended) A method according to claim 8, wherein the determination of step (a) is determined by a differential equation of the form

$$\frac{dC}{dt} = \text{div}(\alpha \cdot \text{grad}(C)) + \beta \cdot C \cdot (1 - C) \cdot (C - \gamma).$$

wherein C is the data field of the crystallinity ~~or a related parameter~~ of the material, div and grad are spatial differential operators and α , β and γ are parameters which ~~determine the~~ describe environmental conditions of the simulation.

10. (currently amended) A method according to claim 5, wherein the spatial evolution of the phase interface is determined by the calculation of probabilities for regions adjacent to the phase interface to switch from one phase into the other in a certain time period, using a monte carlo type random algorithm.

11. (original) A method according to claim 1, wherein said movement of the particles is calculated by a monte carlo type simulation of discrete particle hopping, where the hopping probability of a particle depends on the potential energy of the initial and the final particle position of the hopping event, and where the potential energy of the particle depends on the material phase.

12. (currently amended) A method according to claim 5, wherein the spatial evolution of the phase interface is calculated by means of a movement function of the discontinuity between the phases.

13. (currently amended) A method according to claim 1, wherein the spatial evolution of the phase interface ~~or the movement and/or the distribution of the particles~~ is calculated in dependence ~~of~~ upon a high temperature treatment of the medium.

14. (currently amended) A method according to claim 1, wherein the spatial evolution of the phase interface ~~and/or the movement of the particles~~ is calculated in dependence ~~of~~ upon a potential difference between the two phases.

15. (currently amended) A method according to claim 1, wherein the spatial evolution of the phase interface is calculated in dependence ~~of~~ upon the concentration of the particles.

16. (currently amended) A method according to claim 1, wherein said movement of particles is calculated in dependence ~~of~~ upon a driving force induced by the difference of potential energy in the two phases.

17. (currently amended) A method according to claim 5, wherein the movement of the particles at the discontinuous transition between the two phases is determined in dependence ~~of~~ upon an accumulation of particles at said transition and a particle transport which is proportional to the number of accumulated particles and to the velocity of the discontinuous transition between the two phases.

18. (original) A method according to claim 1, wherein the method is performed for a medium made of a semiconductor material and having at least two different phases and the particles being dopants of the semiconductor.

19. (original) A method according to claim 18, wherein the method is performed for a semiconductor having at least one crystalline and one amorphous phase and a phase interface in between.

20. (currently amended) A method according to claim 19, wherein the method is applied for at least one of the following processes:

- dopant redistribution during solid phase epitaxial (SPE) regrowth
- Indium dopant loss
- Arsenic dopant loss
- Fluorine dose loss
- Arsenic dopant activation during SPE regrowth
- Boron uphill diffusion during SPE regrowth.

21. (original) A method according to claim 18, wherein the method is performed for a semiconductor having at least one solid and one liquid phase and a phase interface in between.

22. (currently amended) A method according to ~~claim 21~~ claim 18, wherein the method is applied on dopant redistribution during liquid phase epitaxial (LPE) regrowth.

23. (currently amended) A method according to claim 22, wherein the method is applied on dopant redistribution during a float zone purification processes process.

24. (currently amended) A method according to claim 18, wherein the method is applied for ~~the~~ dopant redistribution during ~~LASER annealing processes where the laser is powerful enough to melt or amorphize~~ a laser annealing process in which the laser melts or amorphizes an illuminated region of the semiconductor material.

25. (original) A computer program product comprising software code portions for performing a method according to claim 1 when run on a computer.

26. (new) A set of data indicating a distribution of the particles at a particular point in time, produced by a method including the steps of claim 1.

27. (new) A semiconductor device produced using a method including the steps of claim 1.

28. (new) A method according to claim 1, wherein the step of determining the spatial evolution of the interface over time comprises the step of determining the movement of the position of the interface over time.

29. (new) A method according to claim 1, wherein the step of determining the spatial evolution of the interface over time comprises the step of determining the range of the interface over time.

30. (new) A method according to claim 1, wherein the movement of the particles is calculated in dependence upon a high temperature treatment of the medium.

31. (new) A method according to claim 1, wherein the movement of the particles is calculated in dependence upon a potential energy difference between the two phases.

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